PATENT
Customer No. 22,852
Attorney Docket No. 05788.0171

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	
Marco NASSI et al.	)	Group Art Unit: Unassigned
	)	
Serial No.: Unassigned	)	Examiner: Unassigned
	)	
Filed: Herewith	)	
	)	
For: SUPERCONDUCTING CABLE	)	

being a **Continuation** of PCT International Application No. PCT/EP99/10443 filed December 22, 1999

BOX PATENT APPLICATION
Assistant Commissioner for Patents
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Before examining this application, please amend the application as follows:

IN THE SPECIFICATION:

Please amend the specification as follows:

Page 1, after the title, insert a new paragraph as follows:

--CROSS REFERENCE TO RELATED APPLICATIONS

The application is a continuation of International Application No. PCT/EP99/10443, filed December 22, 1999, which is incorporated by reference herein, and claims the priority of EP98204401.8, filed December 24, 1998, and the benefit of U.S. Provisional application No. 60/114,546, filed December 31, 1998, which is incorporated by reference herein.--

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IN THE CLAIMS:

Please cancel claims 1-19 without prejudice or disclaimer and substitute new claims 20-38 therefor as follows:

WHAT IS CLAIMED IS:

20. (New) A superconducting cable having at least one phase comprising:

a) a layer of tapes comprising superconducting material;

b) a tubular element for supporting said layer of tapes comprising superconducting material, said tubular element comprising at least one portion made of metallic material, and being in electrical contact with the layer of tapes comprising superconducting material;

c) a cooling circuit, adapted to cool the superconducting material to a working temperature not higher than its critical temperature, comprising a fluid at a predetermined working pressure ranging between a minimum value and a maximum value;

wherein deformation of said tapes comprising superconducting material, consequent to a temperature variation between room temperature and working temperature of the cable is lower than critical deformation of the same tapes,

characterized in that a predetermined amount of conductive material of resistive type in electrical contact with the layer of superconducting material is present, such that a maximum temperature reached by the superconducting material in case of short circuit is lower than a minimum temperature between the critical temperature of the superconducting material and boiling temperature of said cooling fluid at minimum working pressure of said fluid.

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21. (New) A superconducting cable according to claim 20, wherein said layer of tapes is incorporated within a metallic coating.

22. (New) A superconducting cable according to claim 21, wherein said superconducting material comprises at least one reinforcing foil made of metallic material.

23. (New) A superconducting cable according to claim 22, wherein said superconducting material comprises two reinforcing foils made of metallic material coupled to opposite faces of said layer.

24. (New) A superconducting cable according to claim 22 or 23, wherein said superconducting material is essentially pre-stressed along a longitudinal direction.

25. (New) A superconducting cable according to claim 24, wherein the layer of superconducting material of said at least one tape comprising superconductive material has a pre-stress degree along a longitudinal direction (γ) of between 0.05 and 0.2%.

26. (New) A superconducting cable according to claim 20, wherein the cable comprises a plurality of tapes comprising superconducting material spirally wound on the surface of said at least one supporting tubular element, said tapes having winding angles of between 5° and 60°.

27. (New) A superconducting cable according to claim 23, wherein the reinforcing foil and the metallic coating of said tapes comprising superconducting material is a metal selected from the group consisting of copper, aluminum, silver, magnesium, nickel, bronze, stainless steel, beryllium, and alloys thereof.

28. (New) A superconducting cable according to claim 20, wherein said tubular element is a composite and comprises a first metallic material and a second

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material associated to said first material having a thermal expansion coefficient higher than that of said first material.

29. (New) A superconducting cable according to claim 28, wherein said first and second materials are formed as adjacent annular sectors.

30. (New) A superconducting cable according to claim 29, wherein said annular sectors are arranged one after the other.

31. (New) A superconducting cable according to claim 29, wherein said annular sectors are spirally wound according to a winding angle of between 5° and 50°.

32. (New) A superconducting cable according to claim 28, wherein said first metallic material is a metal having a resistivity of 77 K < $5*10^{-9}$ Ωm, a specific heat at 77 K > 10^6 J/m^{3}K and a heat conductivity at 77 K > 5 W/mK.

33. (New) A superconducting cable according to claim 28, wherein said second material is a non metallic material having a thermal expansion coefficient higher than $17*10^{-6}$ °C^{-1}.

34. (New) A superconducting cable according to claim 33, wherein said second non metallic material is a plastic material selected from the group consisting of polyamide, polytetrafluoroethylene and polyethylene.

35. (New) A conductive element for superconducting cables comprising at least one layer of superconducting material incorporated within a metallic coating supported by a tubular element comprising a predetermined amount of metallic material with which the layer is in electrical contact, said layer of superconducting material being cooled by means of a cooling fluid to a temperature not higher than the cooling fluid's critical temperature, wherein a predetermined amount of conducting material of resistive type is

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present in electrical contact with the layer of superconducting material, such that a maximum temperature reached by the superconducting material in case of short circuit is lower than a minimum temperature between the critical temperature of the superconducting material and boiling temperature of said cooling fluid at minimum working pressure of said fluid.

36. (New) A method adapted to limit the induced stresses along a longitudinal direction in a tape of superconducting material of a superconducting cable comprising the steps of:

a) providing at least one tubular element for supporting a tape of superconducting material comprising a predetermined amount of metallic material, said tubular element being in electrical contact with a tape of superconducting material;

b) spirally winding said tape of superconducting material onto the surface of said at least one tubular element;

c) cooling the superconducting material to a temperature not higher than its critical temperature by means of a cooling fluid;

d) coupling at least one reinforcing foil made of metallic material to said tape of superconducting material; and

e) determining a total amount of metallic material in electrical contact with the layer of superconducting material in such a way that the maximum temperature reached by the superconducting material in case of a short circuit is lower than a minimum temperature between critical temperature of the superconducting material and boiling temperature of said cooling fluid at minimum working pressure of said fluid.

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37. (New) A method according to claim 36, wherein the superconducting material of said tapes of superconducting material has a pre-stress degree along a longitudinal direction (γ) of between 0.05 and 0.2%.

38. (New) A method according to claim 36, wherein the tubular element is a composite and comprises a first metallic material and a second material associated to said first material and having a thermal expansion coefficient higher than that of said first material.

REMARKS

The claims have been amended to conform them to U.S. practice. Claims 20-38 are pending in this application. No new matter has been added.

If there is any fee due in connection with the filing of this Preliminary Amendment, please charge the fee to our Deposit Account No. 06-0916.

Respectfully submitted,

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Dated: JUN 22 2001

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